TABLE 17.—*Mean wind movement (miles per hour).*

Stations.	Length of record (years).	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
San Jose	3	11.1	12.4	10.1	9.8	5.3	4.4	5.3	4.7	4.4	4.1	6.6	8.2	7.2
Ancon	8	8.9	9.6	10.4	8.6	6.2	5.8	6.9	6.3	6.0	6.4	6.3	7.3	7.4
Culebra	5	8.4	9.3	9.8	9.1	6.0	5.0	6.4	5.8	5.3	4.9	6.1	7.8	7.0
Colon	6	13.6	14.9	15.0	13.4	7.8	6.6	8.5	7.8	6.9	7.0	8.8	11.3	10.1

TABLE 18.—*Maximum wind velocity (miles per hour).*

Stations.	Length of record (years).	January.	February.	March.	April.	May.	June.
Ancon	8	28, nw.	29, nw.	30, nw.	26, n.	27, se.	34, s.
Culebra	7	30, n.	33, n.	35, n.	31, n.	28, ne.	31, s.
Colon	6	32, n.	36, ne.	36, ne.	33, ne.	36, n.	33, se.

Stations.	July.	August.	September.	October.	November.	December.	Annual.
Ancon	59, s.	31, ne.	31, ne.	38, se.	26, se.	24, nw.	59, s.
Culebra	39, n.	40, ne.	32, ne.	35, s.	40, ne	27, ne.	40, ne.
Colon	40, s.	30, s.	37, w.	38, sw.	39, sw.	38, n.	40, s.

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NOTES, ABSTRACTS, AND REVIEWS.

HAWAIIAN RAINFALL STATISTICS FOR 1922.[1]

From the published rainfall statistics for Hawaii, 1922, we cull the following interesting information:

The rainfall during the first three months of the year was considerably in excess of the normal; then followed five successive months of deficient rains and the year closed with rainfall about 9 inches below the normal.

The greatest recorded catch, 452.00 inches, was on the summit of Mount Waialeale, Kaui, elevation 5,075 feet [2] and the least 3.18 inches at Olowalu, elevation 10 feet on the leeward shore of Maui. Other points where a catch of more than 300 inches was recorded are, Puu Kukui (upper) Maui, altitude 5,000 feet 346 inches, 103 inches of which is said to have fallen in the single month of January. The catch at Waiakamoi Gulch, Maui, altitude 4,250 ft. was 342.64 inches, which fell in 217 days, or an average of 1.5 inches per day. The rainfall of the Hawaiian Group is almost wholly orographic.

It is only when the northeast trades temporarily weaken or suspend, as happens in the case of the passage of barometric troughs (kona storms), that rain of any consequence falls on the leeward slopes of the islands and this is the explanation of the very small amount registered at Olowalu, as above.—*A. J. H.*

CONCERNING THE ORIGIN AND DISAPPEARANCE OF SURFACES OF DISCONTINUITY IN THE ATMOSPHERE.

By J. W. SANDSTRÖM.

[Abstracted from *Meteorologische Zeitschrift*, Feb. 1923, pp. 37–39.]

The investigations which have been carried on in the mountains of Sweden have revealed several types of surface of discontinuity, some of which are very obvious and of practical importance, and some of which are easily overlooked. As an example of the former, the clear region bordering the coast which is much utilized by coastwise sailors, is due to the meeting of cold, heavy easterly air with warm, westerly air. The westerly air is underrun by the easterly and an ever-thickening cloud layer is formed which eventually reaches the surface of the sea as a fog bank with an almost vertical front. Other, less-marked, discontinuities occur above valleys in which air has been cooled by radiation and another current of air flows over the top of the valley air. Vague discontinuities occur at the upper surface of a layer of warm surface air in a convective region. After sufficient warm air has accumulated, the ascending column gives rise to very sharp discontinuities between itself and the surrounding atmosphere.

The author has conducted researches relative to the temperature distribution in water under quiet conditions and also when surfaces of discontinuity were formed. The results of these investigations, and also of his meteorological observations, indicate that the relative speed of the two adjacent streams and not the difference in temperature alone determines the degree of sharpness of the surface.

Owing to its geographical situation, Sweden becomes the meeting-ground, in winter, of sharp contrasts in temperature between continental air to the east and oceanic air to the west. With moving cyclones in which these masses of air are converted into rapidly moving streams there frequently appear upon the weather map the phenomena which Bjerknes has related to the Polar Front. But between such moving cyclones, the wind speed is diminished and often it is impossible to trace the surface of discontinuity. Thus, the author

[1] Climatological Data, Hawaii Section, Annual Summary 1922. *Thomas R. Blair, Meteorologist.*
[2] Cf. MO. WEA. REV. 47: 305–308.

feels that the Bjerknesian scheme of the moving waves in the Polar Front is not conclusive.—*C. L. M.*

DISTRIBUTION OF ICE IN ARCTIC SEAS, 1922.

[Reprinted from *Nature*, London, Mar. 24, 1923, p. 411.]

The publication by the Danish Meteorological Institute of "The State of the Ice in the Arctic Seas, 1922" directs attention to a somewhat unusual year, but unfortunately information is almost entirely lacking from Siberian waters and very scanty from the Beaufort Sea. By April the extent of pack in the Barents Sea was much smaller than usual. Bear Island, which had been free from ice all winter, was clear, and open water almost reached to Nova Zembla. The edge of the ice continued to retreat. In July the whole west coast of Nova Zembla was clear, and in August Franz Josef Land was probably accessible by open sea.

Early in the year conditions in Spitzbergen were about normal. In May and early June an unusual amount of ice drove round the South Cape before continuous easterly winds, but this resulted in the west coast being practically free from ice for the remainder of the summer. On the north coast conditions were particularly favorable, and a vessel reached latitude 81° 29′ N. Some sealers circumnavigated Spitzbergen, a feat that is not possible in most years. In the Greenland Sea the belt of pack lay more westerly than usual, and though the east coast of Greenland does not appear to have been clear of ice, open water touched the coast in about latitude 74° N. during August. Jan Mayen and the coast of Iceland were free from pack from May onward throughout the summer. On the Newfoundland Banks both pack and icebergs were abundant in early spring, but July was clearer than usual. In Davis Strait the winter ice was thinner and the "west ice" less abundant than usual. In Bering Strait conditions were fairly normal, but along the north coast of Alaska the pack pressed hard and navigation was much hindered.

PREDICTING DROUGHT IN EUROPE.[1]

By F. EREDIA.

[Reprinted from *Science Abstracts*, March 25, 1923, p. 119.]

The author discusses the possibility of forecasting a period of drought some months in advance. Attempts in this direction have not hitherto led to a practical solution of the problem. The method generally adopted is to compare the values of certain meteorological elements, and by means of correlation to deduce from the numerical values of the relative coefficients the connection, intimate or otherwise, between the given elements. Thus some have admitted and others denied the relation between droughts and sunspots, the sun being considered as the primary determinant of all meteorological phenomena. More practical results may be achieved by examining the course of such meteorological elements as are characterized by stability, and of which it is possible to forecast the ulterior direction. Such an element is the barometric pressure.

From an examination of droughts in Italy it is clear that the characteristic barometric distribution is the persistence of anticyclonic areas in the Alpine and adjoining regions. Periods of high pressure coincide with dry periods. Extending our researches to the barometric conditions preceding droughts in the British Isles, it is found that persistent low pressure in the Arctic regions, and especially over Spitzbergen, points to the probable imminence of a dry period. In Italy, with persistent high pressure on the west coast of Europe, and especially on the French Atlantic seaboard, a shortage of rain is almost certain. We are thus led to consider droughts not as isolated phenomena, but as being intimately connected with the atmospheric circulation. The author concludes that we shall be better able to foresee the conditions favorable to the formation of dry periods the more extensive our knowledge of the meteorology of the northern regions, where profound modifications of barometric distribution are first revealed.—*E. F.*

[1] Elettrotecnica, November, 1922, 9: 746-748.

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